

Remarks:

Entry of these amendments is respectfully requested.

Clams 1-3 and 5-6 have been amended to change their format and grammer, as well as to broaden the recitation of "filters and amplifiers" in claim 1. These changes are not being made for any reason related to patentability.


Claim 4 has been amended from a multiple dependent claim to a dependent claim, with the addition of new claim 7 to reflect the dependency on claim 3. This amendment is to reduce filing fees and not for any reason related to patentability.

No new matter has been added as a result of these amendments.

In view of the above amendments and remarks, examination on the merits is respectfully requested.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

Docket No: 2709/OK126

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Panu HAGSTRÖM

Serial No: TO BE ASSIGNED (National Phase of International Patent Application
Serial No. PCT/FI00/00644, filed July 13, 2000)

Filed: CONCURRENTLY HEREWITH

For: STRUCTURE OF A RADIO-FREQUENCY FRONT END

PRELIMINARY AMENDMENT (MARKED UP COPY)

In the Claims:

1. (Amended) A structure of a radio frequency front end comprising as functional units an antenna and at least one bandpass filter and at least one amplifier, in which front end active and passive component parts have been integrated, [characterized in that] the structure further comprising:

- [it comprises] an antenna circuit board on a first surface of which there is at least one radiating element and on a second surface of which there is a conductive plane,

- [said filters and amplifiers are supported by] a second circuit board by which said at least one filter and at least one amplifier are supported, and one surface of which is conductive,

Serial No.: TBA (National Phase of
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- [it further comprises] a protective frame such that the [protective frame,] antenna circuit board [and said] , the second circuit board and the protective frame form a substantially closed space,

wherein

- the antenna circuit board, [said] the second circuit board with attached units and [said] the protective frame form a single solid component, and

- the distance between [said] the second circuit board and the antenna circuit board in said component is substantially smaller than a quarter of a wavelength corresponding to any operation frequency of said front end.

2. (Amended) The structure of claim 1, comprising both a transmit and a receive branch, [characterized in that] said functional units being a duplex filter, a low-noise amplifier [followed by] and a receive filter, a transmit filter [followed by] and a power amplifier, and a directional coupler [are said functional units].

3. (Amended) The structure of claim 1, comprising both a transmit and a receive branch, [characterized in that] said functional units being an antenna filter and antenna switch, a low-noise amplifier [followed by] and a receive filter, a transmit filter [followed by] and a power amplifier, and a directional coupler [are said functional units].

4. (Amended) The structure of claim 2 [or 3, characterized in that] said functional units further being at least a transmit [and receive] branch mixer[s], a receive branch mixer, a modulator, a demodulator and [the] filters associated with these [are said functional units].

5. (Amended) The structure of claim 1, [characterized in that] said [circuit board] antenna [is] being a [multifrequency] multi-frequency antenna [that comprises] having at least two radiating elements on the antenna circuit board.

6. (Amended) A communications apparatus [comprising] having a radio-frequency front end, [characterized in that] which comprises:

- [said front end comprises] an antenna circuit board on a first surface of which there are [the] radiating elements of [the] an antenna of the communications apparatus and on a second surface of which there is a conductive plane,

- [the other functional units in said front end are supported by] a second circuit board by which functional units of said front end are supported, and one surface of which is conductive,

- [said front end further comprises] a protective frame such that the [protective frame, the conductive second surface of the] antenna circuit board, [and the conductive surface of said] the second circuit board and the protective frame form a substantially closed space,

wherein

- the antenna circuit board, [said] the second circuit board with attached units and the protective frame form a single solid component, and

- the distance between [said] the second circuit board and the antenna circuit board in said component is substantially smaller than a quarter of a wavelength, corresponding to any operation frequency of said front end, and

- [in that] said component is completely inside [the] covers of the communications apparatus.